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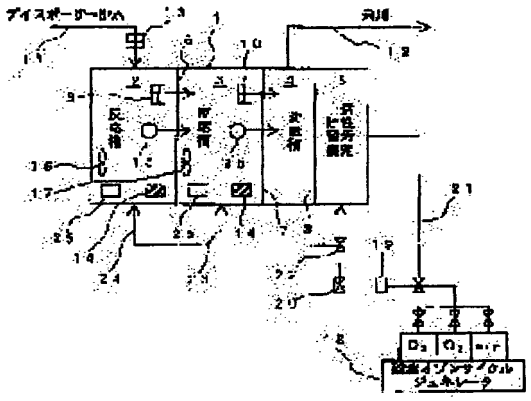
(54) WATER TREATING SYSTEM

(57)Abstract:
PROBLEM TO BE SOLVED: To solve the problem that a solid matter increases when a disposer drainage is flown into a drainage treating equipment which is conventionally available on the market, therefore it is hard to completely treat it, then it is necessary to install the other treating equipment for this kind of drainage system, resulting in increase the cost of installation.
SOLUTION: The problem is solved by feeding service water and ozone into a mixer of a hyperfine structure having a spontaneous pressurizing part with a pressure pump for gas and liquid mixture, and decomposing trihalomethane, agricultural chemicals, etc., contained in the service water. As a result, a user can safely drink city water, and it is unnecessary to invest a large sum of money on the countermeasure.



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CLAIMS

[Claim(s)]
[Claim 1] The water treatment system characterized by carrying out decomposition processing of the trihalomethane with the pressurization section for a waterworks and ozone contained [overly] in the mixer of detailed-ized structure in delivery and the above-mentioned waterworks for pressurization ozone at the moment with the force pump for vapor-liquid mixing.
[Claim 2] The water treatment system characterized [overly] by the thing which have the pressurization section for the activity excess sludge in the processing tub which processes disposer wastewater etc. at the moment with the force pump for vapor-liquid mixing with ozone, and for which it was made to disassemble delivery and the above-mentioned activity excess sludge into a carbon dioxide and water for the above-mentioned pressurization ozone at the mixer of detailed-ized structure.
[Claim 3] The water treatment system characterized [overly] by the thing which have the pressurization section for the active sludge in the processing tub which processes disposer wastewater etc. at the moment with the force pump for vapor-liquid mixing with oxygen and ozone, and biological oxidation was promoted [the thing] for returned sludge by pressurization oxygen in the mixer of detailed-ized structure while disassembling delivery and the above-mentioned activity excess sludge into a carbon dioxide and water for the above-mentioned pressurization ozone.
[Claim 4] The water treatment system characterized by including at the moment the structure with the pressurization section for active sludge which delivery and the above-mentioned activity excess sludge are disassembled [structure] into a carbon dioxide and water for the above-mentioned pressurization ozone, and overly carries out biological oxidation of the returned sludge to the mixer of detailed-ized structure with pressurization oxygen with the force pump for vapor-liquid mixing with oxygen or ozone in a processing tub with a reaction chamber, a sedimentation compartment, and an activity excess sludge reservoir room.
[Claim 5] It is the water treatment system of the claim 1.2.3.4 publication which overly makes welding pressure in the mixer of detailed-ized structure 0.5kg/cm2 or more, and is characterized by the thing which have the pressurization section at the moment, and for which pressurization time amount was made into 0.01 - 0.1 seconds at the moment.
[Claim 6] The water treatment system according to claim 5 characterized by having ******(ed) the processing tub at the reaction chamber, the sedimentation compartment, and the active sludge reservoir room, and also preparing the circuit which pumps activity excess sludge out of a depot, and processing disposer wastewater, nightsoil wastewater, sewage, industrial liquid waste, etc.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is efficient in a waterworks, disposer wastewater, the waste of ordinary homes, nightsoil wastewater, industrial liquid waste, etc., and it relates to invention which obtains the water treatment system which the installation etc. was completed and lessened organic substance sludge as much as possible about disposer wastewater, without needing the large-scale facility especially like the former about the water treatment system processed without moreover generating an offensive odor etc.
[0002]
[Description of the Prior Art] Drawing 12 and the thing shown in 13 are drawings showing the purification system currently used conventionally at a luxury flat or ordinary homes. The system shown in drawing 12 is a system which attached the water purifier having activated carbon in the inside of the tank formed in the roof of a building, or an outlet, and the system shown in drawing 13 attaches the water purifier which contained small activated carbon or a small hollow filament etc. in the waterworks faucet of ordinary homes. Although the waterworks which removes drawing 12 and the foreign matter with which each thing shown in 13 is contained in a waterworks, for example, bleaching powder, the chlorine material for disinfection, etc. by previous activated carbon, and is easy to drink it was obtained, by this method, trihalomethane, agricultural chemicals, etc. which have become the center of attention recently were unremovable.
[0003] For this reason, the method of removing this trihalomethane from a waterworks has been examined variously. It is the approach into which a typical thing gives ozone to and makes a halogen divide. however, the halogen decomposition (separation) by the ozone by which the conventional proposal is made -- in law, since it was what only carries out aeration of the ozone into a waterworks, unless contact to ozone and waterworks did not work in single time amount but prepared the big facility, effectiveness of the above-mentioned separation was not expectable. When it was going to do this in the place where a land price is very high like an urban apartment for this reason, an installation cost and investment cost dearly and what unrealizable was the actual condition.
[0004] Next, when the disposer of a commercial item was attached in ordinary homes about disposer wastewater, as for the grain size (mm) of a kitchen garbage, 1.0 or less were what it is hard to process since the solid content by which 55% and more than it are contained during 45% and wastewater is too large (decomposition to a carbon dioxide and water). Therefore, it was impossible on problems, such as time constraint, to have processed disposer wastewater like common sewage by the existing processing tub. For the reason, when a disposer was installed, the installation of the processing tub of dedication other than the above-mentioned processing tub was needed. if disposer waste water treatment becomes possible, since the kitchen garbage collection conveyance enterprise currently undertaken by local administration is lost by the kitchen garbage, of course, it becomes large saving -- although conveyance of the kitchen garbage to a collection location etc. is lost also at ordinary homes, and also it turns out that a great merit comes out since environmental pollution, such as being stinking, etc. is lost -- this and a city -- the above -- it did not spread easily on problems, like investment of an expensive installation and a large sum is needed.
[0005] Next, processing of a home waste is explained with drawing 14 . In drawing, as for 101, the processing tub of a waste water treatment equipment and the nozzles 109, 110, and 111 to which in 102 a tap hole, and 104 and 105 spout a septum and, as for 106, 107, and 108, input and 103 spout ozone and air in a processing room and these processing rooms 106, 107, and 108 are formed. It is the guidance cylinder by which the oxidation-reduction-potential sensor by which the box-like screen with which 112 consists of the wire gauze made from

stainless steel, and 113 detect a microorganism maintenance machine, and 114 detects the oxidation reduction potential of treated water, and 115 lead the water of a pars basilaris ossis occipitalis to a processing room, and 125 leads it to a tap hole 103. Ozonizers 119, 120, and 121 are connected to the above-mentioned nozzles 109, 110, and 111 through ducts 116, 117, and 118. Ozonizers 119, 120, and 121 are constituted by the regulator 122 which adjusts the electrical potential difference or frequency for impressing RF alternating voltage to the ozone generating component which formed the electrode on the dielectric, respectively, and this component, and adjusts an ozone yield. In addition, this regulator 122 (controller) adjusts an ozone yield within a 0.05 ppm - 170 ppm ozone density range. Moreover, the pump 124 is connected to the above-mentioned ozonizers 119, 120, and 121 through the duct 123. This pump 124, a duct 123, ducts 116, 117, and 118, and nozzles 109, 110, and 111 constitute an ozone jet means. The power source and pump 124 of ozonizers 119, 120, and 121 are connected to AC power supply through Switches 119a, 120a, and 121a and pump switch 124a, respectively.

[0006] The waste water treatment equipment which has this configuration works as follows, and processes a home waste. That is, the lid 126 of the processing layer 101 is opened, the switches 119a-121a after specified quantity ****** are put into the microorganism maintenance machine 113 for the microorganism cultivated beforehand, ozonizers 119-121 are started, switch 124a is put in, and a pump 124 is driven. By carrying out like this, from input 102, it is decomposed into a carbon dioxide and water by ozone and the microorganism at the home waste which flowed in the processing tub 101, or the processing rooms 106, 107, and 108, and it is drained by the river etc. from a tap hole 103, and goes. In addition, this seed processing tub is proposed by patent No. 1872373.

[0007]

[Problem(s) to be Solved by the Invention] Consideration of the point indicated below in the above-mentioned conventional processor was not made. 1. The effective means which carries out decomposition processing of the trihalomethane which is the cancerating substance contained in the waterworks (tap water) using ozone is not proposed, and suggestion is not carried out, either.

[0008] 2. It is not taking into consideration including disposer wastewater in a common waste. That is, disposer wastewater must be able to process the thing of one 22 times [6 to] the concentration [1300 - 5500 mg/L and] of this to the purification processing tub for home use having been designed by the object at least in 200 mg/L by BOD concentration. As for the conventional disposer wastewater, for this reason, a duty of installation of the large-sized primary treatment tub of dedication was imposed before said processing tub. However, although this primary treatment tub was not shown in drawing, since it was only what carries out aeration of air and the ozone into a tub, moreover, it could not but send a lot of high-concentration things for air and ozone. Therefore, the technical problem of taking pains over surplus ozonization occurred as well as a sustaining cost being attached highly. Moreover, in order to have to prepare the large-sized primary treatment tub of dedication independently before a processing tub, technical problems, like installation area and a maintenance become troublesome occurred not to mention investment cost.

[0009] 3. Since the structure to which aeration of the ozone generated with the ozonizer is carried out at a processing room was taken, the diffuser section carried out blinding, and as shown in drawing 11 , it is obliged to exchange in about three years. Moreover, engine-performance degradation, such as ozone grant effectiveness, is natural in the process in which it results in [these] three years. 4. The idea which spreads a disposer, for example, loses a kitchen garbage from the whole apartment, and is referred to as making a comfortable living environment was what is not suggested anywhere.

[0010]

[Means for Solving the Problem] This invention is made that the above-mentioned technical problem should be solved. That is, since it is made to carry out decomposition processing of the trihalomethane with the pressurization section for a waterworks and ozone contained [overly] in the mixer of detailed-ized structure in delivery and the above-mentioned waterworks for pressurization ozone with the force pump for vapor-liquid mixing at the moment, it can consider as the system which does not carry out the facility [itself] enlargement and which can be adopted also in a city. Moreover, abolition of a home water purifier etc. is attained by adoption of this system. furthermore, in this invention, it has the pressurization section for the activity excess sludge in the processing tub which processes disposer wastewater etc. at the moment with the force pump for vapor-liquid mixing with ozone again -- super- -- the mixer of detailed-ized structure -- delivery -- Since it is made to decompose into a carbon dioxide and water for the above-mentioned pressurization ozone, the above-mentioned activity excess sludge As well as a large cost cut being made to what dipping up had taken a large amount of costs that sludge tends to collect like disposer wastewater, attach an installation cost at a low price,

and installation area is small, and it ends, and also various effectiveness -- it can be managed even if it does not draw up -- is acquired.
[0011] moreover, it has the pressurization section for the active sludge in the processing tub which processes disposer wastewater at the moment with the force pump for vapor-liquid mixing with oxygen and ozone -- super- -- the mixer of detailed-ized structure -- delivery -- While decomposing into a carbon dioxide and water for the above-mentioned pressurization ozone, the above-mentioned activity excess sludge Since biological oxidation is promoted by pressurization oxygen, returned sludge That a large cost cut is made to drawing up the sludge which prepared the primary treatment tub of dedication and collected further like disposer wastewater as compared with what had required a large amount of costs, of course An installation cost is attached at a low price, and since effectiveness, such as a facility being small and ending, was acquired, and also oxygen is pressurized similarly and it was made to give, biological oxidation is accelerated, and the amount of sludge can be reduced still further.
[0012] moreover, it has the pressurization section for active sludge at the moment with the force pump for vapor-liquid mixing with oxygen or ozone -- super- -- the mixer of detailed-ized structure -- delivery -- The structure to which the above-mentioned activity excess sludge is disassembled into a carbon dioxide and water for the above-mentioned pressurization ozone, and biological oxidation of the returned sludge is carried out with pressurization oxygen A reaction chamber, Since it includes in a processing tub with a sedimentation compartment and an activity excess sludge reservoir room, the processing system to which sludge does not come out of the engine performance of the existing water treating unit as well as the ability to improve much more can be obtained.
[0013] Moreover, welding pressure in the mixer of detailed-ized structure is overly made into 0.5kg/cm2 or more, pressurization time amount is made very much into 0.01 - 0.1 seconds at the moment at short kana time amount, and since it was made to be possible [water treatment], without causing the accident which ozone concurs with, a water treatment system is obtained satisfactory [, such as safety,] (the pressure of ozone, the concentration of ozone, the amount of **** ozone).
[0014] Moreover, since a processing tub is constituted from a reaction chamber, a sedimentation compartment, and an active sludge reservoir room, activity excess sludge is pumped out of a depot to a circuit and disposer wastewater, nightsoil wastewater sewage, industrial liquid waste, etc. are processed, it can decompose into a carbon dioxide and water certainly while making activity excess sludge ****, and activity excess sludge can be lost.
[0015]
[Embodiment of the Invention] The gestalt of operation of the water treatment system in connection with this invention is explained to a detail below, referring to a drawing. In drawing 1 , a water treatment system and this body 1 of a water treatment system consist of the reaction vessel 2, a reaction vessel 3, a setting tank 4, and active sludge depot 5 grade for 1 first. 6, 7, and 8 are separators which carry out the cell of between the above-mentioned tubs. 9 and 10 are the screens formed in the above-mentioned separator 6 and the seven sections. The solid between tubs is caught by these screens 9 and 10, and wastewater, a fine kitchen garbage, etc. shift to the next tub. In addition, returned sludge and activity excess sludge are intermingled in the above-mentioned active sludge depot 5.
[0016] 11 is input which leads disposer wastewater, common wastewater for home use, nightsoil, etc. to a water treatment system. 12 is a tap hole for passing in a river Nakamizu purified with the water treatment system. The screen with which 13 was prepared in the middle of input 11, and 14 detect a microorganism maintenance machine by the oxygen reduction potential sensor, and 15 detects the oxygen reduction potential of treated water. With the agitator which agitates the sludge in a tub, 16 and 17 agitate the sludge in a reaction vessel 2 and 3 so that sludge may be mixed with oxygen, and they promote decomposition. 18 is prepared at the moment in the middle of the circuit 21 where the mixer 20 of detailed-ized structure overly with the pressurization section at the mixer of detailed-ized structure, this vapor-liquid mixing force pump 19, and the moment with [19 / an oxygen ozone cycle generator and / a vapor-liquid mixing force pump] the pressurization section in 20 **** active sludge. The change-over valve in which 22 was prepared in the middle of the previous circuit 21, and the paths 23 and 24 which return the active sludge which flows a circuit 21 to this change-over valve 22 to the previous reaction vessels 2 and 3 are formed.
[0017] Next, the detail of the above-mentioned microorganism maintenance machine 14 is explained. The microorganism in this microorganism maintenance machine 14 (aerobic bacteria) maintains the amounts of survival, such as a reaction vessel 2 and aerobic bacteria in three. And the above-mentioned microorganism

performs an amylolysis operation, sugar disintegration, fatty-acid disintegration, a proteolysis operation, lignin disintegration, a nitrification, sulfurization, and fibrin disintegration, respectively. And this microorganism is chosen from bacteria, Rhizobium, a yeast fungus, nitrification bacteria, and a mold group. Moreover, two or more kinds of above-mentioned bacilli may be blended at a predetermined rate. In addition, this bacillus is the compound bacteria which can act in a 4-80-degree C temperature requirement.

[0018] Next, it attaches and explains to purification of the activity excess sludge in the active sludge depot 5 using drawing 3 . It is the circuit which circulates through as 5 shows the activity excess sludge in the active sludge depot 5 to an active sludge depot and 21 is shown in drawing in drawing 3 , and is again returned in the active sludge depot 5. 19 -- a vapor-liquid mixing force pump and 20 -- a moment -- the object for pressurization -- the oxygen ozone cycle generator with which the mixer of detailed-ized structure and 18 overly supply oxygen and ozone to a circuit 21. In here, the vapor-liquid mixing force pump 19 is explained first. This pump 19 is a pump which does not raise a gas lock and an air lock but transports gases, such as active sludge, oxygen, or ozone, and while a rotor rotates, it is a pump of the type which carries out both-way operation. There is Mono pump marketed from HEISHIN ENGINEERING & EQUIPMENT CO., LTD. as an example of this pump. the oxygen or ozone which this vapor-liquid mixing pump 19 generated with active sludge and oxygen, and the ozone cycle generator 18 in the circuit 21 from the active sludge depot 5 -- drawing in -- the object for next moment pressurization -- it overly sends into the mixer 20 of detailed-ized structure. This pump 19 is a pump which can be sent even if it carries out the rate of a gas (oxygen or ozone) and a liquid (sludge) half-and-half, as explained also in advance than it is a rotor-type pump.

[0019] Next, the mixer 20 of detailed-ized structure is overly explained. The mixer 20 (as shown in drawing 2 , A fluid and B fluid flow into the reaction section 27, and are changed by the spiral passage 28 in the style of a whorl.) of **** detailed-ized structure According to the violent centrifugal force cut at this time, heavy matter gathers outside and light matter gathers to the inside. Also in an outside heavy fluid layer, an inside light fluid layer also serves as a super-very fine particle group with the needlelike collision object 29. this time -- this -- the mixer 20 of detailed-ized structure is overly constituted so that the pressure of 0.5kg/cm2 or more may occur with internal resistance. Moreover, flowing fluid converts the inside of this mixer 20 into time amount, and it has been 0.04 seconds. Within this mixer 20, it is the thing of the type to which the micro particle group of a heavy fluid and the micro particle group of a light fluid collide each other violently continuously, and react. And the OHR line mixer by SEIKA CORP. of this type of mixer is it. this mixer -- an instant (0.04 seconds) -- the particle diameter of 0.5-3 microns -- it is overly detailed **** -- it is **.

[0020] This oxygen and ozone that were made detailed by the mixer 20 of detailed-ized structure overly contact sludge in the state of pressurization. A deer is carried out, activity excess sludge is disassembled into a carbon dioxide and water at the time of ozone impregnation, and it promotes the biological oxidation of returned sludge at the time of oxygen. In addition, since [with sufficient installing in this place where the oxygen ozone cycle generator 18 of the mixer 20 of detailed-ized structure is overly comparatively near] the activity force of ozone is strong, it uses for being the most efficient within in 10 seconds after Shigeo. Next, it returns to drawing 1 and the oxygen ozone cycle generator 18 is explained. This oxygen ozone cycle generator 18 has the regulator which adjusts the electrical potential difference or frequency of the ozone generating component in which the electrode was formed on the dielectric, the RF high-voltage power source for impressing RF alternating voltage to these components, and this power source, and adjusts an ozone yield, and also has the oxygen generator. And it is constituted also so that the above-mentioned ozone or oxygen can also be supplied to a circuit 21 according to the life cycle, when required.

[0021] The work of the ozone at this time is as follows. That is, according to the oxidation of ozone, and an oil distribution operation, the oil under wastewater decomposes and an offensive odor is removed. For example, ozone decomposes n-hexane into water and a carbon dioxide. in the water treatment system which has this configuration, the activity excess sludge in a tub 5 is attracted with oxygen or ozone by the pump 19 for vapor-liquid mixing, and it has the pressurization section at the moment -- it is overly sent into the mixer 20 of detailed-ized structure. the above-mentioned sludge and ozone are ** within an instant here into the sludge and the gas with a particle diameter of 0.5-3 microns of super-**** -- it withers. With it, it reacts in the state of previous oxygen or ozone (ultrafine particle), and pressurization, and is decomposed into a carbon dioxide and water at the time of biological oxidation reduction and ozone at the time of oxygen, and the above-mentioned sludge returns to an activated sludge tank 5, respectively. The organic substance in this tub 5 disappears and goes by repeating this.

[0022] The oxygen and the ozone cycle generator 18 which are shown in drawing 3 can also double and switch

the generating stage of this oxygen and ozone to a user's life pattern. In addition, oxygen and ozone do not need to say that it is because a reaction with sludge came to be carried out in an instant for the reason to which the change-over became possible in this way. For example, it is generating ozone like [at the time of breakfast preparations], when comparatively few and a kitchen garbage's comes [of a kitchen garbage] out of oxygen so much like the time of supper preparations, and removing a smell etc. Via the above vapor-liquid mixing force pump, at the moment, if oxygen and ozone are overly supplied to the mixer of detailed-ized structure with sludge, the engine performance always stabilized as shown in drawing 11 will be obtained as well as the difference in the engine performance which shows mere air in Table 1 as compared with the thing with the pressurization section which carried out aeration into sludge coming out. From what carried out aeration of the oxygen in Table 1 becoming one 6 to 10 times the dissolved concentration of this by dissolved oxygen concentration as compared with air aeration, biological oxidation improves much more. Moreover, to the smell of most oxygen aeration being lost, when a smell compares, it turns out that effectiveness goes up [oxygen supply] several times as compared with air supply so that air aeration may say that a smell will remain.

[Table 1]

空気曝気と酸素曝気の性能比較

項目		酸素曝気	空気曝気
溶存酸素濃度	mg/L	6～20	1～2
滞留時間（流入水流量基準）	時間	0．5～2．0	6～8
BOD容積負荷	kgBOD/m³・日	1．5～3．0	0．3～0．8
臭い	有無	無に近い	有り
油脂の分解	有無	有り	無し

[0023] Whether welding pressure's overly being given to sludge using the mixer of detailed-ized structure and that difference which, on the other hand, has the moment pressurization section of this invention and which is not given are as being shown in drawing 4 . Namely, if it sees at 90% of oxygen densities, in the condition of not pressurizing, to being 38 mg/L, it becomes 43.8 mg/L and one about 1.2 times the concentration of this can be secured by the condition of having pressurized. Mixer adoption of detailed-ized structure is overly efficient, and it turns out [which have the pressurization section at the moment of giving oxygen also from this to sludge etc. in the state of pressurization] that is contributed to the miniaturization of a device.

[0024] Drawing 5 shows an overly according to mixer of detailed-ized structure ozone property with the pressurization section at the moment. As explained previously, although sludge concentration seldom changed to the initial state in the place from which sludge rose 3 Hrs by [which have the pressurization section at the moment] overly ultrafine-particle-izing sludge in an ozone list by the mixer of detailed-ized structure as for this invention, it is the thing of 2000 mg/L and the conventional technique which can be made into the sludge concentration of 7 about 1/in the place of 3Hr(s) at a pressure type. (In addition, even if it compares with a non-energized type, what was processed falls to several [1/] by sludge concentration.)

Moreover, the resolvability ability of the ozone made [above-mentioned] detailed is as being shown in Table 2. That is, as well as the ability to make the ozone of this invention or less [of a commercial item] into 1/tens of thousands conventionally in cellular size, welding pressure in the mixer of this invention is made into 0.5kg/cm2 or more (hundreds times of the conventional article), an ozone level can be managed with the part low concentration according to detailed-izing and a pressure effect, and since the full dissolution is carried out, there is no effect which it has on others as well as the body.

[Table 2]

余剰汚泥のオゾン分解性能

	本発明	従来市販品
オゾン気泡サイズ	0．5～3ミクロン	粗大粒子（数万ミクロン）
加圧の有無	0．5kg／cm²以上	――――
オゾン温度	低温度	高温度
分解効率	80％	20～30％
最適所要濃度量の制御	制御 ｛酸化還元電位（ORP） ｛溶存酸素（DO）	制御なし

Moreover, if it is going to obtain the above-mentioned welding pressure with the depth of water of the tank dug underground, it is necessary to dig deeply 5m or more but, and since it was made overly to obtain within the mixer of detailed-ized structure, facility construction is a thing with the pressurization section simplified very much at the moment, without this invention's carrying out this.

[0025] In addition, in order to melt well the above-mentioned gaseous-phase ozone and oxygen in water, the particle of one gas is made small.

2) Raise gaseous-phase ozone or an oxygen density.

3) Raise gaseous-phase ozone or the oxygen pressure force.

4) Lower solution temperature.

It is known well that ** is effective. The above-mentioned circuit 21 of this invention is this inside. 1 and 3 are incorporated. That is, at the moment, the mixer of detailed-ized structure is overly a thing with the pressurization section which raises the pressure of gaseous-phase ozone while making the particle of a gaseous phase small.

[0026] Next, the example with the pressurization section which used the mixer of detailed-ized structure for the waterworks processing system is overly explained with drawing 6 and drawing 7 at the moment of describing above. the waterworks tank by which 30 was installed in the roof of a luxury flat etc., and the waterworks of municipal management [tank / 30 / this / waterworks] -- the conduit 31 is connected. The conduit tube (connected with a faucet) 19 to ordinary homes is a water pipe which sends the waterworks with which the waterworks tank was covered with 32 to each home, and 33 is a vapor-liquid mixing force pump. 20 has the pressurization section at the moment -- super- -- the mixer of detailed-ized structure. when it is the water treatment system which has this structure, the vapor-liquid mixing force pump 19 has the pressurization section for ozone and a waterworks at the moment by the force which itself has as well as the ability even of a waterworks tank (roof installation) to lift a waterworks -- it overly sends to the mixer 20 of detailed-ized structure. Ozone and a waterworks serve as a very fine particle here, as explained previously. Therefore, ozone disassembles a halogen from methane in response to the trihalomethane contained in a waterworks. By this, trihalomethane carries out decomposition disappearance. Even if ozone may remain, a waterworks is covered with ozone and a waterworks tank is not covered with the gas of penetration and ozone itself.

[0027] the waterworks which drawing 7 removes the waterworks tank 30 in drawing 6 , and supplies water to a direct general home -- the example with the pressurization section which overly attached the mixer 20 of detailed-ized structure is shown in a conduit 31 at the vapor-liquid mixing force pump 19 and the moment. Of course, ozone is supplied to the vapor-liquid mixing force pump 19. Also in this thing, trihalomethane is decomposed by ozone like drawing 6 . Next, a different example from drawing 1 with drawing 8 - drawing 10 is explained. Drawing 8 is drawing showing the example which lost the active sludge depot of the water treatment system shown in drawing 1 . That is, when it is this thing, the previous water treatment system itself can be made small. Moreover, since what is shown in drawing 9 incorporates the circuit 21 of drawing 1 in an active sludge depot, it is not necessary to form the special circuit 21. Moreover, what is shown in drawing 10 shows the example from which it differs when the configuration of the water treatment system itself changes. Above (as shown in drawing 8 - drawing 10 , even if a configuration changes somewhat, if it overly has an oxygen ozone generator in the mixer of detailed-ized structure, and it, in short, the effectiveness of this invention is a thing

with the pressurization section fully obtained at a vapor-liquid mixing force pump and the moment.)
[0028] When it is the water treatment system equipped with this invention which has this configuration, from input 11, a solid is first removed by the screen 13 and the disposer wastewater included in a waste water treatment equipment, gray water, nightsoil water, and industrial liquid waste go into a reaction vessel 2. In this tub 2, this activated microorganism that aerotropism and a microorganism activate carries out biodegradation of the kitchen garbage under wastewater which enters in a reaction vessel, or the nightsoil by oxygen aeration returned sludge. And the purified wastewater moves to the following reaction vessel 3. A big solid has migration prevented by the wire gauze-like screen 9, of course also at this time. The biological oxidation reduction of the wastewater is carried out by the microorganism activated like the reaction vessel 2, a reaction vessel 3 is also purified, and the purified water moves to a setting tank 4 through a screen 10. Of course in reaction vessels 2 and 3, it is work of the oxidation reduction sensor 15, and the above-mentioned oxygen generator was controlled and the condition that a microorganism tends to work is completed. The solid of minerals other than the water of wastewater included in a setting tank 4 precipitates spending many hours on the setting tank 4 lower part. And only the wastewater with which biochemical oxygen demand (BOD), chemical oxygen demand (COD), etc. became below the reference value will be drawn by the tap hole at a river side. In addition, the deposit of the minerals accumulated in the inferior surface of tongue of a setting tank 4 is applied to dipping up in the collected phase.
[0029] The active sludge which came to the setting tank on the other hand is moved to the active sludge depot 5 side. Although the active sludge included in this active sludge depot 5 is the assembly of sludge and a microorganism, and it constructs and must discard the way things stand, this invention disassembles this activity excess sludge into a carbon dioxide and water using ozone, performs pure oxygen aeration to returned sludge, promotes biological oxidation reduction, and enables it to discharge it to a river etc. That is, in this invention, the sludge accumulated in the active sludge depot 5 is processed in a circuit 21. The vapor-liquid hybrid model force pump formed in the middle of the above-mentioned circuit attracts active sludge to a circuit 21. The sludge attracted by this pump and oxygen, or ozone is made detailed, contacts in the state of the above-mentioned sludge and pressurization, and performs a oxidation reduction deordorization operation. Although previous sludge will be disassembled by this and it will pass at a tap hole side, the sludge which was not disassembled is returned to a reaction vessel through paths 23 and 24. Furthermore, if it explains, the vapor-liquid mixing force pump 19 formed in the circuit 21 and the oxygen ozone in which oxygen and ozone cycle JIENETA 18 overly make the mixer 20 of detailed-ized structure will be incorporated, and the biological oxidation reduction of returned sludge and decomposition with the carbon dioxide of excess sludge and water will be promoted. Of course, each mixer of detailed-ized structure is overly the above-mentioned vapor-liquid hybrid model force pump and a thing which maintains the interior in pressure of about 0.5kg/cm2 or more. When it ****, it is saying that oxygen and ozone are given to excess sludge in the state of this pressurization. By this, the solubility to the inside of sludge improves and oxidation reduction improves much more. Moreover, although oxygen ozone can also be generated periodically, as for oxygen and an ozone cycle generator, oxygen ozone independent generating can also be performed. Therefore, it is saying that only ozone may be sent only for oxygen at a circuit 21.
[0030]
[Effect of the Invention] A processing tub [this invention has the input and the tap hole of an exhaust port and also] with an oxygen ozone generating means, In the drainage system equipped with the microorganism maintenance means to which biodegradation of the sludge in the above-mentioned processing tub is carried out Oxygen is overly contacted to the above-mentioned returned sludge within the mixer of detailed-izing. while preparing ****** which pumps out the sludge in the above-mentioned processing tub out of a tub and forming a vapor-liquid mixing force pump in the middle of the circuit, it has the pressurization section at the moment -- Contact ozone to biological oxidation reduction and excess sludge, and the disintegration of a carbon dioxide and water is promoted. Disposer garbage disposal wastewater, gray water, nightsoil water, industrial liquid waste, etc. are processed, since installation of the large-sized first processing tub prepared conventionally is made unnecessary, incineration processing of a kitchen garbage and sludge can be made unnecessary, and environmental loads can be sharply reduced with processing cost. Moreover, a dissolution of the high cost problem of activity excess sludge processing, reduction of installation necessary area, etc. which are made into the fate of sewage treatment are attained.
[0031] Moreover, it is not necessary to drink harmful matter at a vapor-liquid mixing force pump and the moment to waterworks as well as the water purifiers with the pressurization section currently used conventionally at the general home being reducible if a detailed-ized mixer is overly formed in waterworks piping of an apartment.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The functional diagram of the waste-water-treatment system equipped with this invention.
[Drawing 2] Drawing with the pressurization section at the moment of being used for drawing 1 which overly explains the mixer of detailed-ized structure.
[Drawing 3] Drawing explaining the circuit established in the activity excess sludge section of drawing 1 .
[Drawing 4] Drawing showing the oxygen density and dissolved oxygen concentration at the time of pressurization.
[Drawing 5] the object for the moment pressurization of this invention -- drawing having shown the sludge concentration overly when using a detailed-ized structure mixer.
[Drawing 6] waterworks tank inlet ports, such as an apartment, -- a moment -- the object for pressurization -- drawing showing the example which overly installed the mixer of detailed-ized structure.
[Drawing 7] drawing in which drawing 6 shows a different example -- a moment -- the object for pressurization -- drawing showing the example which overly installed the mixer of detailed-ized structure in the outlet of a waterworks tank.
[Drawing 8] Drawing showing the example which lost the activity excess sludge tub of the waste water treatment equipment shown in drawing 1 .
[Drawing 9] drawing showing a different example from drawing 8 -- the inside of an activity excess sludge tub -- a moment -- the object for pressurization -- drawing showing the example which overly installed the mixer of detailed-ized structure.
[Drawing 10] Drawing showing the example which separated the setting tank of the waste water treatment equipment shown in drawing 1 , and the activity excess sludge tub from the above-mentioned equipment.
[Drawing 11] Drawing showing the DISUFUYUZA clogging condition currently used conventionally and oxygen dissolution effectiveness.
[Drawing 12] Drawing showing the conventional water purification system.
[Drawing 13] Drawing in which drawing 11 shows the different conventional example.
[Drawing 14] It is drawing showing the waste water treatment equipment of the waste currently generally used.
[Description of Notations]
1 Water Treatment System 16 Agitator
2 Reaction Vessel 17 Agitator
3 Reaction Vessel 18 Oxygen Ozone Cycle Generator
4 Setting Tank 19 Vapor-liquid Mixing Force Pump
5 Active Sludge Depot 20 it Has Pressurization Section at the Moment -- Super- -- Mixer of Detailed-ized Structure
6 Separator 21 Circuit
7 Separator 22 Change-over Valve
8 Separator 23 Path
9 Screen 24 Path
10 Screen 25 Oxygen Generator
11 Input 30 Waterworks Tank
12 Tap Hole 31 Waterworks -- Conduit
13 Screen 32 Water Pipe
14 Microorganism Maintenance Machine 33 Conduit Tube

15 Oxygen Reduction Potential Sensor

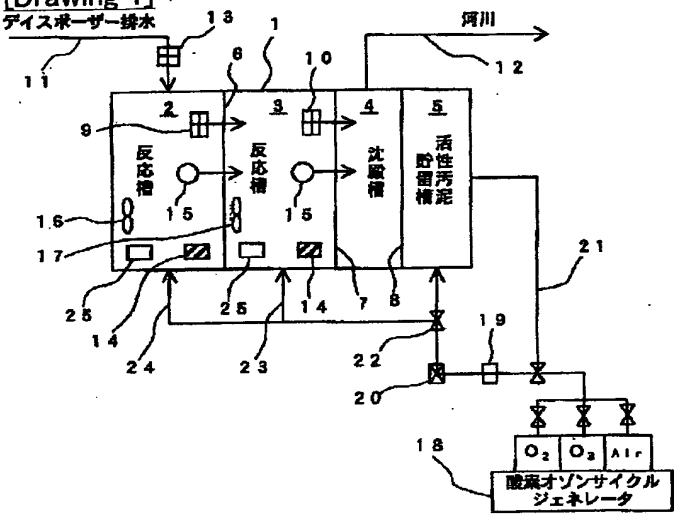
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



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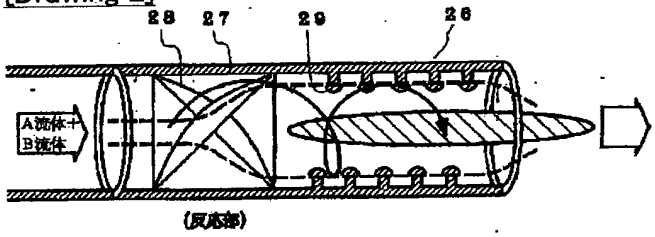

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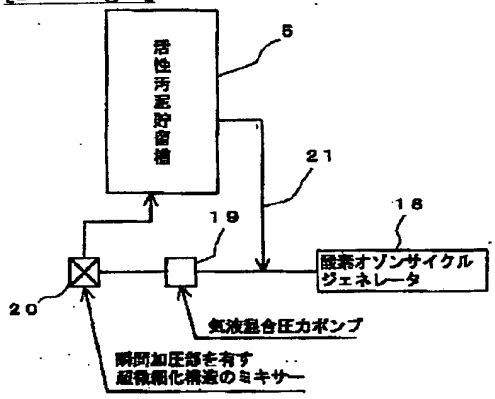
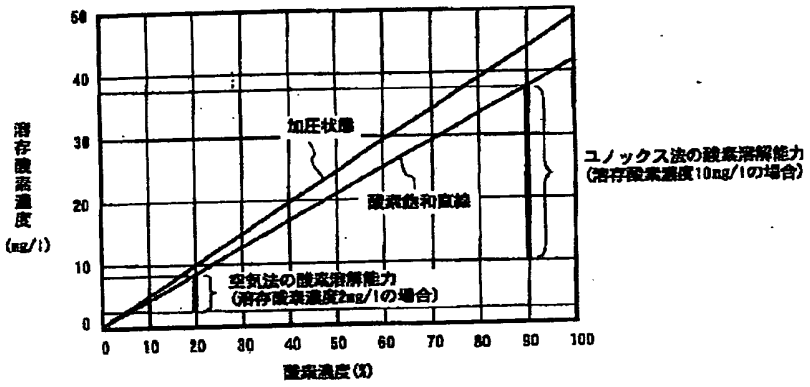


[Drawing 4]

【図４】



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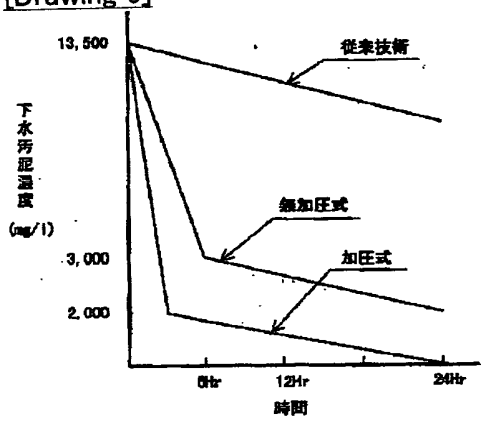

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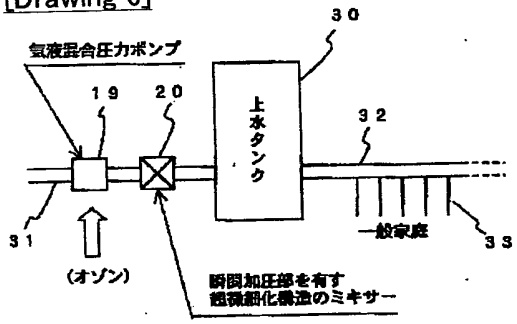

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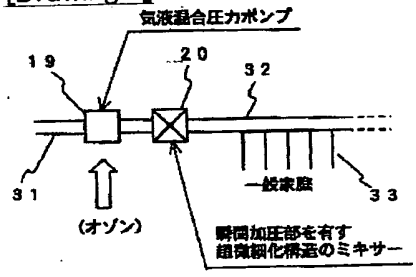

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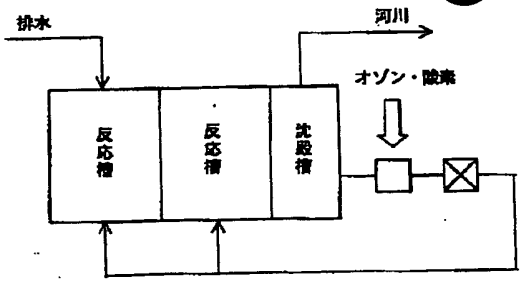

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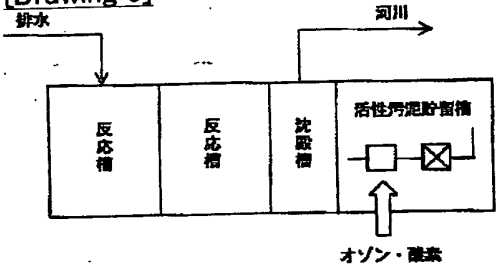

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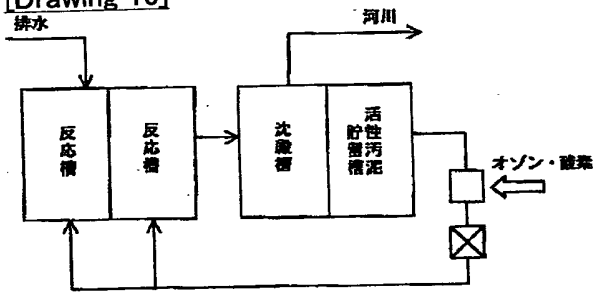

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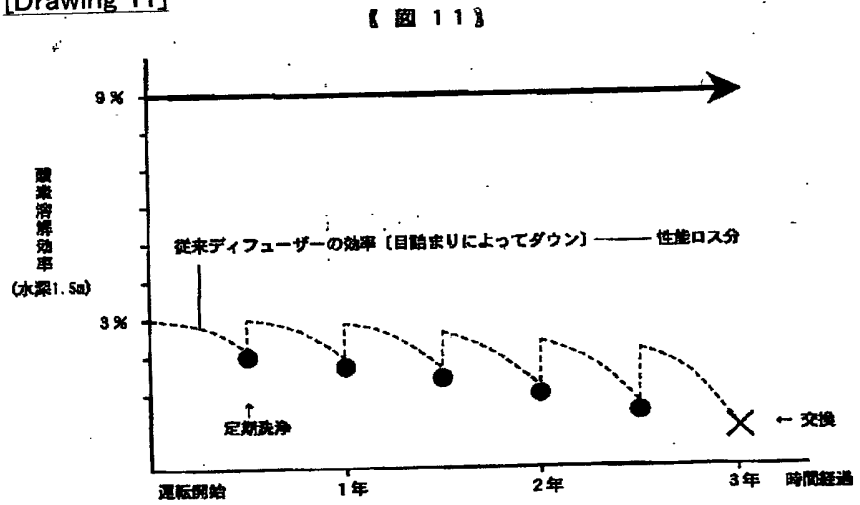
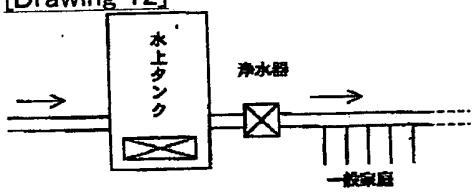


[Drawing 12]



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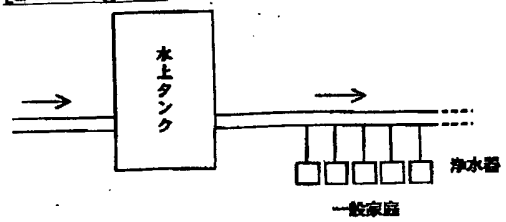
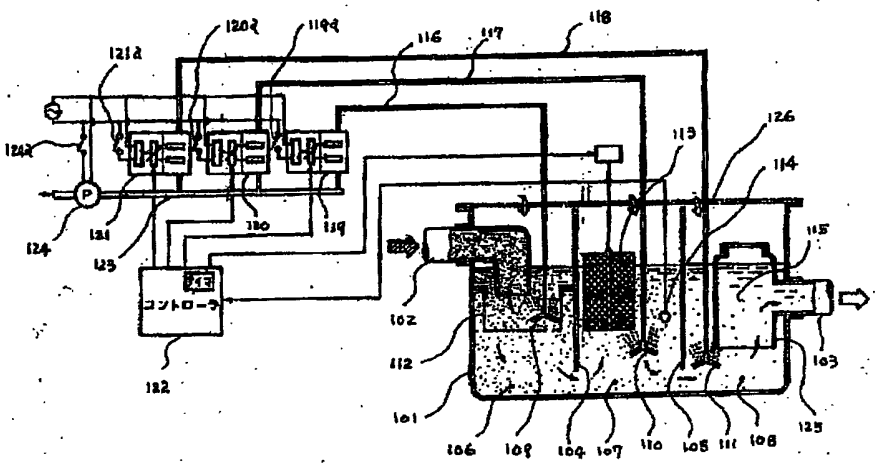


[Drawing 14]

【図14】



[Translation done.]

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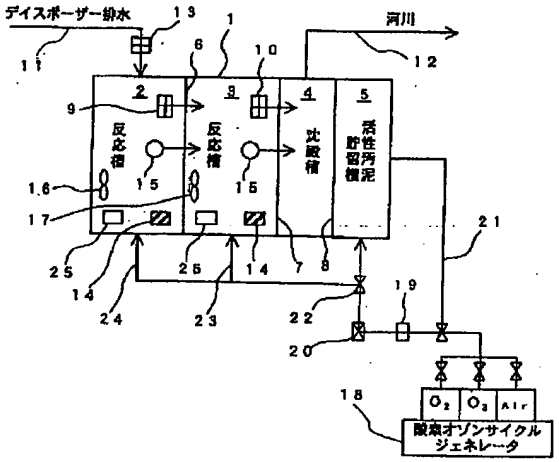
4D059 AA05 AA07 BC02 BK01 BK12
CA22 CA28 DA43 EB08 EB16

(54)【発明の名称】　水処理システム

(57)【要約】
【課題】　従来一般に市販されている排水処理装置にディスポーザ排水を流すと固形分が増え、処理しきれなくなる。そこでこの種のものは通常別の処理装置を備える必要があった。この為設備費が高く付くと云う問題があった。
【解決手段】　上水とオゾンとを気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記上水中に含まれるトリハロメタン、農薬等を、加圧オゾンで分解処理することにより、上記課題を解消するものである。
【効果】　利用者は安心して、水道水を飲むことが出来ることは勿論、対策に多額の費用を投じることがないものである。



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【特許請求の範囲】

【請求項１】　上水とオゾンとを気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記上水中に含まれるトリハロメタン等を、加圧オゾンで分解処理するようにしたことを特徴とする水処理システム。

【請求項２】　ディスポーザー排水等を処理する処理槽内の活性余剰汚泥をオゾンと共に気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記活性余剰汚泥を上記加圧オゾンで二酸化炭素と水とに分解するようにしたことを特徴とする水処理システム。

【請求項３】　ディスポーザー排水等を処理する処理槽内の活性汚泥を酸素、オゾンと共に気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記活性余剰汚泥を、上記加圧オゾンで二酸化炭素と水とに分解すると共に、返送汚泥を加圧酸素により生物酸化を促進するようにしたことを特徴とする水処理システム。

【請求項４】　活性汚泥を酸素或いはオゾンと共に気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記活性余剰汚泥を上記加圧オゾンで二酸化炭素と水に分解し、返送汚泥を加圧酸素で生物酸化させる仕組みを反応室、沈殿室、活性余剰汚泥貯留室をもつ、処理槽に組み込んだことを特徴とする水処理システム。

【請求項５】　瞬間加圧部を有す超微細化構造のミキサー内の加圧力は０．５ｋｇ／ｃｍ^2 以上とし、瞬間加圧時間は０．０１～０．１秒としたことを特徴とする請求項１．２．３．４記載の水処理システム。

【請求項６】　処理槽を反応室と沈殿室と活性汚泥貯留室とで構成っする他、活性余剰汚泥を貯留槽から汲み出す循環路を設け、ディスポーザー排水、し尿排水、下水、及び工場排水等を処理するようにしたことを特徴とする請求項５記載の水処理システム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】　本発明は、上水、ディスポーザー排水、一般家庭の雑排水、し尿排水、工場排水等を効率良く、しかも悪臭等を発生させることなく処理するようにした水処理システムに関するもので、特に従来の如く大がかりな設備を必要とすることなく、据付工事等が出来且つディスポーザー排水等については、有機物汚泥を極力少なくした水処理システムを得る発明に係わるものである。

【０００２】

【従来の技術】　図１２、１３に示すものは従来高級マンション或いは一般家庭で使われている浄化システムを示す図である。図１２に示すシステムは、ビルの屋上に設けたタンク内若しくは出口等に活性炭を内蔵した浄水器を取り付けたシステムであり図１３に示すシステムは

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一般家庭の水道蛇口に小形の活性炭或いは中空糸等を内蔵した浄水器を取り付けたものである。図１２、１３に示すものは何れも上水に含まれる異物、例えばカルキ或いは消毒用塩素材等を先の活性炭で取り除き、飲み易い上水を得るようにしたものであるが、この方式では最近話題になっているトリハロメタン、農薬等を除去することは出来なかった。

【０００３】この為、上水よりこのトリハロメタンを除去する方法が種々、検討されて来ている。代表的なものがオゾンを付与しハロゲンを分離させる方法である。しかし、従来提案されているオゾンによるハロゲン分解（分離）法ではオゾンを単に上水中に散気させるものであるためオゾンと上水との接触が単時間ではうまくいかず、大きな設備を準備しないと上記分離の効果が期待出来なかった。この為都会のマンションの如く地価が非常に高い所でこれをやろうとすると、設備費及び投資額が高くつき、実現できないのが実状であった。

【０００４】次に、ディスポーザー排水について、市販品のディスポーザーを一般家庭に取り付けた場合、生ゴミの粒度（ｍｍ）は１．０以下が５５％、それ以上が４５％と排水中に含まれる固形分が大き過ぎる為、処理（二酸化炭素と水への分解）しにくいものであった。従ってディスポーザー排水を既存の処理槽で一般下水と同じように処理することは時間的制約等の問題で不可能であった。その為、ディスポーザーを設置した場合には上記処理槽の他に、専用の処理槽の設置が必要となっていた。ディスポーザー排水処理が可能になれば、地方行政で行っている生ゴミ収集運搬事業が生ゴミ分無くなるため大幅な節約になることは勿論一般家庭に於いても、収集場所迄の生ゴミの運搬等がなくなる他、臭い等の環境汚染等もなくなるので多大なメリットが出ることは判っているが、これまた都会では、上記高価な設置場所、多額の投資が必要となる等の問題でなかなか普及しなかった。

【０００５】次に家庭用雑排水の処理について図１４をもって説明する。図に於いて、１０１は排水処理装置の処理槽、１０２は流入口、１０３は流出口、１０４、１０５は隔壁、１０６、１０７、１０８は処理室、この処理室１０６、１０７、１０８にはオゾン、及び空気を噴出するノズル１０９、１１０、１１１が設けられている。１１２はステンレススチール製金網から成る箱状のスクリーン、１１３は微生物維持器、１１４は処理水の酸化還元電位を検出する酸化還元電位センサ、１１５は処理室、１２５は底部の水を流出口１０３に導く案内筒。上記ノズル１０９、１１０、１１１には管路１１６、１１７、１１８を介して、オゾナイザ１１９、１２０、１２１が接続されている。オゾナイザ１１９、１２０、１２１はそれぞれ誘電体上に電極を形成したオゾン発生素子とこの素子に高周波交流電圧を印加するための電圧又は周波数を調整してオゾン発生量を調整する調整

器１２２により構成されている。尚この調整器１２２（コントローラ）はオゾン発生量を０．０５ｐｐｍ～１７０ｐｐｍのオゾン濃度範囲内で調整する。又上記オゾナイザ１１９、１２０、１２１には管路１２３を介してポンプ１２４が接続されている。このポンプ１２４、管路１２３、管路１１６、１１７、１１８及びノズル１０９、１１０、１１１はオゾン噴出手段を構成する。オゾナイザ１１９、１２０、１２１の電源とポンプ１２４はそれぞれスイッチ１１９ａ、１２０ａ、１２１ａ及びポンプスイッチ１２４ａを介して交流電源に接続されている。

【０００６】かかる構成を有する排水処理装置は次のように働き、家庭用雑排水の処理を行う。即ち、処理層１０１の蓋１２６を開け、予め培養された微生物を微生物維持器１１３に所定量いれた後、スイッチ１１９ａ～１２１ａを入れてオゾナイザ１１９～１２１を起動し、スイッチ１２４ａを入れてポンプ１２４を駆動する。こうすることにより流入口１０２より処理槽１０１内に流入した家庭用雑排水或いは、処理室１０６、１０７、１０８でオゾン及び微生物により二酸化炭素と水とに分解され、流出口１０３より河川等に排水されて行くものである。尚、この種処理槽は特許第１８７２３７３号に提案されているものである。

【０００７】

【発明が解決しようとする課題】　上記した従来の処理装置に於いては次に記載する点の考慮がなされてなかった。１．上水（水道水）に含まれている発ガン性物質であるトリハロメタンをオゾンを使って分解処理する有効な手段が提案されていないし、示唆もされていない。

【０００８】２．一般雑排水にディスポーザー排水を含めることを考慮していない。即ち一般家庭用の浄化処理槽がＢＯＤ濃度で２００ｍｇ／Ｌ位を対象に設計されていたのに対し、ディスポーザー排水は１３００～５５００ｍｇ／Ｌと６倍から２２倍の濃度のものを処理出来なければならない。この為従来のディスポーザー排水は前記処理槽の前に専用の大型一次処理槽の設置が義務付けられていた。ところが、この一次処理槽は図には示していないが槽内に空気及びオゾンを曝気させるだけのものであった為、空気、オゾンを多量でしかも高濃度のものを送らざるを得なかった。従って維持費が高く付くことは勿論、余剰オゾン処理に苦労する等の課題があった。又、処理槽の前に専用の大型一次処理槽を別に設けなければならない為に投資費用は勿論のこと、据付面積、維持管理が煩わしくなる等の課題があった。

【０００９】３．オゾナイザで発生したオゾンを処理室で曝気させる構造をとっている為にディフューザー部が目詰まりし、図１１に示す如く約３年で交換を余儀なくされている。又この３年に至る過程でオゾン付与効率等の性能劣下は当然である。４．ディスポーザーを普及し、例えばマンション全体から生ゴミをなくし快適な生活環境を作ろうと言う、考えはどこにも示唆されていないものであった。

【００１０】

【課題を解決するための手段】　本発明は上記課題を解決すべくなされたものである。即ち、上水とオゾンとを気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記上水中に含まれるトリハロメタン等を、加圧オゾンで分解処理するようにしたものであるから設備自体大型化することがなく、都会に於いても採用出来るシステムとすることができるものである。又このシステムの採用により家庭用浄水器等の廃止が可能となるものである。更に又本発明に於いては、ディスポーザー排水等を処理する処理槽内の活性余剰汚泥をオゾンと共に気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記活性余剰汚泥を、上記加圧オゾンで二酸化炭素と水とに分解するようにしたものであるから、ディスポーザー排水の如く汚泥が溜まり易く汲み取りに多額の費用を要していたものには、大幅なコストダウンが出来ることは勿論、設備費は安くつき、且つ据付面積は小さくて済む他、汲み取りをしなくても済む等、種々の効果が得られるものである。

【００１１】又、ディスポーザー排水を処理する処理槽内の活性汚泥を酸素、オゾンと共に気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記活性余剰汚泥を、上記加圧オゾンで二酸化炭素と水とに分解すると共に、返送汚泥を加圧酸素により生物酸化を促進するようにしたものであるから、ディスポーザー排水の如く、専用の一次処理槽を設け更に溜った汚泥を汲み取るのに多額の費用を要していたものに比較し大幅なコストダウンが出来ることは勿論、設備費は安くつき、且つ設備は小さくて済む等の効果が得られる他、同じように酸素も加圧して付与するようにしたので生物酸化が加速され、汚泥量を尚一層減らすことが出来るものである。

【００１２】又、活性汚泥を酸素或いはオゾンと共に気液混合用圧力ポンプで瞬間加圧部を有す超微細化構造のミキサーに送り、上記活性余剰汚泥を上記加圧オゾンで二酸化炭素と水に分解し、返送汚泥を加圧酸素で生物酸化させる仕組みを反応室、沈殿室、活性余剰汚泥貯留室をもつ、処理槽に組み込んだものであるから既存の水処理装置の性能を一段と向上することが出来ることは勿論、汚泥の出ない処理システムを得ることが出来るものである。

【００１３】又、超微細化構造のミキサー内の加圧力は０．５ｋｇ／ｃｍ² 以上とし、瞬間加圧時間は０．０１～０．１秒と非常に短かな時間にし、オゾンが併発する事故を発生することなく水処理が出来るようにしたので、安全性、（オゾンの圧力、オゾンの濃度、成存オゾン量）等の問題なく水処理システムが得られるものである。

【００１４】又、処理槽を反応室と沈殿室と活性汚泥貯留室とで構成し、活性余剰汚泥を貯留槽から循環路に汲み出し、ディスポーザー排水、し尿排水下水、工場排水等を処理するようにしたものであるから、活性余剰汚泥を循還させる途中で確実に二酸化炭素と水に分解し、活性余剰汚泥をなくすことが出来るものである。

【００１５】

【発明の実施の形態】　以下本発明にかかわる水処理システムの実施の形態を図面を参照しながら詳細に説明する。先ず図１に於いて、１は水処理システム、この水処理システム本体１は反応槽２、反応槽３、沈殿槽４、活性汚泥貯留槽５等より構成されている。６、７、８は上記槽間を隔室する隔離板である。９、１０は上記隔離板６、７部に設けられたスクリーンである。槽間の固形物は、このスクリーン９、１０によりとらえられ、排水と細かい生ゴミ等が隣の槽に移行する。尚、上記活性汚泥貯留槽５内には返送汚泥と活性余剰汚泥とが混在しているものである。

【００１６】１１は水処理システムにディスポーザー排水、家庭用の一般排水、し尿等を導く流入口である。１２は水処理システムで浄化された中水を河川に流す為の流出口である。１３は流入口１１の途中に設けられたスクリーン、１４は微生物維持器、１５は酸素還元電位センサーで処理水の酸素還元電位を検出する。１６、１７は槽内の汚泥を撹拌する撹拌機で反応槽２、３内の汚泥を酸素と汚泥が混るよう撹拌し、分解を促進する。１８は酸素オゾンサイクルジェネレータ、１９は気液混合圧力ポンプ、２０は瞬間加圧部を有す超微細化構造のミキサー、この気液混合圧力ポンプ１９と瞬間加圧部を有す微細化構造のミキサー２０とは活性汚泥を循還する循環路２１の途中に設けられている。２２は先の循環路２１の途中に設けられた切換弁、この切換弁２２には循環路２１を流れる活性汚泥を先の反応槽２、３に戻す通路２３、２４が設けられている。

【００１７】次に上記した微生物維持器１４の詳細を説明する。この微生物維持器１４内の微生物（好気性バクテリア）は反応槽２、３内の好気性バクテリア等の生存量を維持するものである。そして上記微生物は、澱粉分解作用、糖分分解作用、脂肪酸分解作用、蛋白質分解作用、リグニン分解作用、硝酸化作用、硫酸化作用、繊維素分解作用をそれぞれ行う。そしてこの微生物は細菌、根粒菌、酵母菌、硝化菌、糸状菌群から選択される。又上記菌を所定の割合で複数種類配合することもある。尚この菌は４～８０℃の温度範囲で作用可能な複合バクテリアである。

【００１８】次に、図３を用いて活性汚泥貯留槽５内の活性余剰汚泥の浄化に付いて説明する。図３に於いて５は活性汚泥貯留槽、２１は活性汚泥貯留槽５内の活性余剰汚泥を図に示す如く循環し、再び活性汚泥貯留槽５内に戻す循環路である。１９は気液混合圧力ポンプ、２０は瞬間加圧用超微細化構造のミキサー、１８は循環路２１に酸素、オゾンを供給する酸素オゾンサイクルジェネレータ。ここに於いて先ず気液混合圧力ポンプ１９について説明する。本ポンプ１９は活性汚泥と酸素或いはオゾン等の気体をガスロック、エアロックを起こさず移送するポンプで、ローターが回転しながら、往復運転をするタイプのポンプである。このポンプの例としては兵神装備株式会社より市販されている、モノポンプがある。この気液混合ポンプ１９は活性汚泥貯留槽５より循環路２１に活性汚泥及び酸素、オゾンサイクルジェネレータ１８で発生した酸素或いはオゾンを吸引し後の瞬間加圧用超微細化構造のミキサー２０に送り込む。このポンプ１９は先にも説明した如くローター式のポンプであることより、気体（酸素或いはオゾン）と液体（汚泥）の割合を半々にしても送れるポンプである。

【００１９】次に超微細化構造のミキサー２０について説明する。本超微細化構造のミキサー２０は（図２に示す如く、Ａ流体、Ｂ流体が反応部２７に流入し、らせん状流路２８によって、らせん流に変換される。この時おきる猛烈な遠心力により、重い物質は外側へ、軽い物質は内側へ集まる。針状の衝突体２９によって外側の重質流体層も、内側の軽質流体層も超微細粒子群となる。この時この超微細化構造のミキサー２０は内部抵抗により圧力０．５ｋｇ／ｃｍ² 以上が発生するよう構成されている。又このミキサー２０内を流れる流体は時間に換算して０．０４秒となる。このミキサー２０内では重質流体のミクロ粒子群と、軽質流体のミクロ粒子群とが連続して激しく衝突し合い反応するタイプのものである。そしてこのタイプのミキサーは、西華産業株式会社製のＯＨＲラインミキサーがそれである。このミキサーは一瞬（０．０４秒）で粒子径０．５～３ミクロンの超微細にくだくものである。

【００２０】この超微細化構造のミキサー２０では、微細化された酸素及びオゾンが汚泥に加圧状態で接触する。しかしてオゾン注入時は活性余剰汚泥を二酸化炭素と水に分解し、酸素の時には返送汚泥の生物酸化を促進する。尚、この超微細化構造のミキサー２０は酸素オゾンサイクルジェネレータ１８とは比較的近い所に設置するのが良い、何故ならば、オゾンは活性力が強い為、成生後１０秒以内で使うのが一番効率が良い為である。次に図１に戻って酸素オゾンサイクルジェネレータ１８について説明する。この酸素オゾンサイクルジェネレータ１８は誘電体上に電極を形成したオゾン発生素子と、これらの素子に高周波交流電圧を印加するための高周波高電圧電源と、この電源の電圧又は周波数を調整してオゾン発生量を調整する調整器を有している他、酸素発生装置を有している。そして生活周期に合せて必要な時に上記オゾン或いは酸素を循環路２１に供給することも出来るようにも構成されている。

【００２１】この時のオゾンの働きは次の通りである。

即ち、オゾンの酸化作用及び油分分散作用により、排水中の油分が分解し、悪臭を消すものである。例えばオゾンによりｎ－ヘキサンを水と二酸化炭素に分解するものである。かかる構成を有する水処理システムに於いては、気液混合用ポンプ１９により酸素或いはオゾンと共に槽５内の活性余剰汚泥が吸引され、瞬間加圧部を有す超微細化構造のミキサー２０に送り込まれる。ここで一瞬の内に上記汚泥及びオゾンは粒子径０．５～３ミクロンの超微細の汚泥及び気体にくだかれる。それと共に上記汚泥は先の酸素或いはオゾン（超微粒子）と加圧状態で反応し、酸素の時には生物酸化還元、オゾンの時には二酸化炭素と水とに分解され、それぞれ活性汚泥槽５に戻る。これを繰り返すことにより該槽５内の有機物が消滅して行くものである。

【００２２】図３に示す酸素、オゾンサイクルジェネレータ１８は、この酸素、オゾンの発生時期を使用者の生活パターンに合わせ、切り換えることもできる。尚この＊ように切換が可能になった理由は、酸素、オゾン共に汚泥との反応が瞬時に遂行されるようになった為であることは云うまでもない。例えば朝食支度時のように、生ゴミの比較的少ない時には酸素を、夕食支度時の如く、生ゴミが多量に出る時にはオゾンを発生させ、臭いを消す等である。以上の気液混合圧力ポンプを経由して瞬間加圧部を有す超微細化構造のミキサーに汚泥と共に酸素、オゾンを供給したものであると、単なる空気を汚泥中に曝気したものに比較し、表１に示す性能の違いが出る事は勿論、図１１に示すようにいつも安定した性能が得られるものである。表１に於いて酸素を曝気したものは空気曝気に比較し溶存酸素濃度で６～１０倍の溶存濃度となることより、生物酸化は一段と向上する。又、臭いで比較すると、酸素曝気はほとんど臭いがなくなるのに対し、空気曝気は臭いが残ってしまうと云う様に、酸素供給が空気供給に比較し、数倍効率があがることが判る。

【表１】

空気曝気と酸素曝気の性能比較

項目		酸素曝気	空気曝気
溶存酸素濃度	mgL	６～２０	１～２
滞留時間（流入水流量基準）	時間	０．５～２．０	６～８
ＢＯＤ容積負荷	kgBODM^{3}・日	１．５～３．０	０．３～０．８
臭い	有無	無に近い	有り
油脂の分解	有無	有り	無し

【００２３】一方本発明の瞬間加圧部を有す超微細化構造のミキサーを使い汚泥に加圧力を付与するか付与しないかの差は図４に示す通りである。即ち、酸素濃度９０％で見ると、加圧しない状態では３８ｍｇ／Ｌであるのに対し、加圧した状態では４３．８ｍｇ／Ｌとなり約１．２倍の濃度を確保することが出来る。このことからも加圧状態で酸素を汚泥等に付与する瞬間加圧部を有す超微細化構造のミキサー採用が効率的であり、機器の小型化に貢献することが判る。

【００２４】図５は瞬間加圧部を有す超微細化構造のミキサーによるオゾン特性を示したものである。先に説明した如く、本発明は瞬間加圧部を有す超微細化構造のミキサーによりオゾン並びに汚泥を超微粒子化することにより、下水汚泥が３Ｈｒたった所では、汚泥濃度は初期状態とあまり変わらなかったが、加圧式では３Ｈｒの所で２０００ｍｇ／Ｌと従来技術の約１／７の汚泥濃度とすることが出来るものである。（尚、無加圧式と比較しても加工したものは下水汚泥濃度で数分の一に低下するものである。）

又、上記微細化したオゾンの分解性能は表２に示す通りである。即ち、本発明のオゾンは気泡サイズで従来市販品の数万分の一以下とすることが出来ることは勿論、本発明のミキサー内の加圧力は０．５ｋｇ／ｃｍ^{2} 以上（従来品の数百倍）とし、オゾン濃度は微細化と加圧効果によりその分低濃度で済み、完全溶解されるから、人体は勿論、他に与える影響はないものである。

【表２】

余剰汚泥のオゾン分解性能

	本発明	従来市販品
オゾン気泡サイズ	０．５～３ミクロン	粗大粒子（数万ミクロン）
加圧の有無	０．５ｋｇ／ｃｍ^{2}以上	――――
オゾン濃度	低濃度	高濃度
分解効率	８０％	２０～３０％
最適所要濃度量の制御	制御 ｛酸化還元電位（ＯＲＰ） ｝溶存酸素（ＤＯ）	制御なし

又上記加圧力を地下に掘るタンクの水深で得ようとすると、５ｍ以上深く掘る必要があるが、本発明はこれをしないで瞬間加圧部を有す超微細化構造のミキサー内で得るようにしたので、設備施工は非常に簡素化されるものである。

【００２５】尚、上記気相オゾン及び酸素を水に良く溶かすには、

１）気体の粒子を小さくする。

２）気相オゾン、或いは酸素濃度を高める。

３）気相オゾン、或いは酸素圧力を上げる。

４）液温を下げる。

等が効果的であることは良く知られている。本発明の上記循環路２１はこの内　１）、３）を盛り込んだものである。即ち、瞬間加圧部を有す超微細化構造のミキサーは気相の粒子を小さくすると共に気相オゾンの圧力を上げるものである。

【００２６】次に上記した瞬間加圧部を有す超微細化構造のミキサーを、上水処理システムに利用した例を図６、図７をもって説明する。３０は高級マンションの屋上等に設置された上水タンク、この上水タンク３０には市営の上水導管３１が接続されている。３２は上水タンクに溜まった上水を各々の家庭に送る送水管、３３は一般家庭への導水管（蛇口につながる）１９は気液混合圧力ポンプ。２０は瞬間加圧部を有す超微細化構造のミキサー。かかる構造を有する水処理システムであった場合、気液混合圧力ポンプ１９は、それ自体のもつ力で上水タンク（屋上設置）まで、上水を揚げることが出来ることは勿論、オゾンと上水を瞬間加圧部を有する超微細化構造のミキサー２０に送る。ここでオゾン及び上水は先に説明した如く、微細粒子となる。従って、オゾンが上水中に含まれるトリハロメタンに反応して、ハロゲンをメタンより分解する。このことにより、トリハロメタンは分解消滅する。若しオゾンが余るようなことがあってもオゾンが上水に溶け込み、オゾン自体の気体が上水タンクに溜まることがないものである。

【００２７】図７は図６中の上水タンク３０を取り除き、直接一般家庭に給水する上水導管３１に気液混合圧力ポンプ１９と瞬間加圧部を有す超微細化構造のミキサー２０を取付けた例を示したものである。勿論気液混合圧力ポンプ１９にはオゾンが供給されるものである。このものに於いても図６同様、トリハロメタンがオゾンにより分解されるものである。次に図８～図１０をもって図１とは異なる実施例を説明する。図８は図１に示す水処理システムの活性汚泥貯留槽をなくした例を示す図である。即ち、このものであった場合、先の水処理システム自体を、小さくすることが出来るものである。又、図９に示すものは活性汚泥貯留槽内に図１の循環路２１を組み込んでしまったものであるので、特別な循環路２１を設ける必要がないものである。又、図１０に示すものは水処理システム自体の構成が変わった時の異なる例を示すものである。上記（図８～図１０に示す如く構成が多少変わっても、要は気液混合圧力ポンプと瞬間加圧部を有す超微細化構造のミキサー、それに酸素オゾン発生装置をもっていれば本発明の効果は十分に得られるものである。

【００２８】かかる構成を有する本発明を備えた水処理システムであった場合、流入口１１より排水処理装置に入ったディスポーザー排水、生活雑排水、し尿水、工場排水は、先ず固形物がスクリーン１３により除去され反応槽２に入る。この槽２では酸素曝気返送汚泥により、好気性、微生物は活性化する、この活性化した微生物は反応槽内に入って来る排水中の生ゴミ、或いは、し尿等を生物分解する。そして、浄化された排水は次の反応槽３に移る。勿論この時も金網状スクリーン９により大きな固形物は移動を阻止される。反応槽３でも反応槽２同様活性化した微生物により排水は生物酸化還元され浄化する、そして浄化された水がスクリーン１０を通して沈殿槽４に移る。反応槽２、３に於いては勿論酸化還元センサー１５の働きで、上記酸素ジェネレーターを制御し、微生物が最も活動しやすい状態を作りあげている。沈殿槽４に入った排水の水以外の無機質の固形物は、沈殿槽４下部に時間をかけて沈殿する。そして生物化学的

酸素要求量（ＢＯＤ）、科学的酸素要求量（ＣＯＤ）等が基準値以下となった排水だけが、流出口により河川側に導出されることとなる。尚、沈殿槽４の下面に蓄積した無機質の体積物は溜まった段階で汲み取りにかけられる。

【００２９】一方沈殿槽にきた活性汚泥は活性汚泥貯留槽５側に移される。この活性汚泥貯留槽５に入った活性汚泥は、汚泥と微生物の集まりであり、このままでは組み取って廃棄しなければならないものであるが、本発明は、この活性余剰汚泥をオゾンを使って二酸化炭素と水とに分解し、返送汚泥には純酸素曝気を行い生物酸化還元を促進して河川等に放流できるようにしたものである。即ち、本発明においては、活性汚泥貯留槽５に蓄積された汚泥を、循環路２１で処理するようにしたものである。循環路２１に活性汚泥を吸引するのは、上記循環路の途中に設けられた気液混合型圧力ポンプである。このポンプに吸引された汚泥及び酸素或いはオゾンは、微細化し、上記汚泥と加圧状態で接触し、酸化還元脱臭作用を行う。このことにより先の汚泥は分解され、流出口側に流されることとなるが、分解されなかった汚泥は、通路２３、２４を通して反応槽に戻されるものである。更に説明するならば、循環路２１に設けられた気液混合圧力ポンプ19、超微細化構造のミキサー２０は、酸素、オゾンサイクルジェネータ１８が作り出す酸素オゾンを取り込んで返送汚泥の生物酸化還元及び余剰汚泥の二酸化炭素と水との分解を促進するものである。勿論、上記気液混合型圧力ポンプ、超微細化構造のミキサーは何れも内部を０．５ｋｇ／ｃｍ² 程度以上の圧力に維持しておくものである。換云すると、酸素、オゾンはこの加圧状態で余剰汚泥に付与されると云うことである。このことにより、汚泥中への溶解度は向上し酸化還元は一段と向上するものである。又、酸素、オゾンサイクルジェネレータは、酸素オゾンを周期的に発生させることも出来るが、酸素オゾン単独発生も出来るものである。従って循環路２１には、酸素のみオゾンのみが送られることがあると云うことである。

【００３０】

【発明の効果】　本発明は排水口の流入口と流出口を有する他、酸素オゾン発生手段を有す処理槽と、上記処理槽内の汚泥を生物分解させる微生物維持手段とを備えた排水装置に於いて、上記処理槽内の汚泥を槽外に汲み出す循還路を設け、その循環路途中に気液混合圧力ポンプを設けると共に瞬間加圧部を有す超微細化のミキサー内で上記返送汚泥と酸素を接触させ、生物酸化還元、及び余剰汚泥にオゾンを接触させ二酸化炭素と水との分解作用を促進し、ディスポーザー生ゴミ処理排水、生活雑排水、し尿水、工場排水等を処理し、従来設けていた大型の第１次処理槽の設置を不要としたものであるから、生ゴミと汚泥の焼却処理を不要とし、処理コストと、環境負荷を大幅に削減することが出来るものである。又、下水処理の宿命とされる活性余剰汚泥処理の高コスト問題の解消と設置所要面積の削減等も可能となるものである。

【００３１】又、上水に気液混合圧力ポンプと瞬間加圧部を有す超微細化ミキサーを例えばマンションの上水配管に設けるようにすれば、従来一般家庭で使われていた浄水器等を削減することが出来ることは勿論、有害物質を飲まなくてすむものである。

【図面の簡単な説明】

【図１】本発明を備えた排水処理システムの機能図。

【図２】図１に使用されている瞬間加圧部を有す超微細化構造のミキサーを説明する図。

【図３】図１の活性余剰汚泥部に設けられた循環路を説明する図。

【図４】加圧時の酸素濃度と溶存酸素濃度を示す図。

【図５】本発明の瞬間加圧用超微細化構造ミキサーを使用した時の下水汚泥濃度を示した図。

【図６】マンション等の上水タンク入口に瞬間加圧用超微細化構造のミキサーを設置した例を示す図。

【図７】図６とは異なる実施例を示す図で瞬間加圧用超微細化構造のミキサーを上水タンクの出口に設置した例を示す図。

【図８】図１に示す排水処理装置の活性余剰汚泥槽をなくした例を示す図。

【図９】図８と異なる実施例を示す図で活性余剰汚泥槽内に瞬間加圧用超微細化構造のミキサーを設置した例を示す図。

【図１０】図１に示す排水処理装置の沈殿槽、活性余剰汚泥槽を上記装置より分離した例を示す図。

【図１１】従来使われているディスフューザ目詰り状態と酸素溶解効率を示す図。

【図１２】従来の浄水システムを示す図。

【図１３】図１１とは異なる従来例を示す図。

【図１４】一般に使用されている雑排水の排水処理装置を示す図である。

【符号の説明】

１　水処理システム	１６　攪拌機
２　反応槽	１７　攪拌機
３　反応槽	１８　酸素オゾンサイクルジェネレータ
４　沈殿槽	１９　気液混合圧力ポンプ
５　活性汚泥貯留槽	２０　瞬間加圧部を有す超微細化構造のミキサー
６　隔離板	２１　循環路
７　隔離板	２２　切換弁
８　隔離板	２３　通路
９　スクリーン	２４　通路
１０　スクリーン	２５　酸素ジェネレータ
１１　流入口	３０　上水タンク
１２　流出口	３１　上水導管

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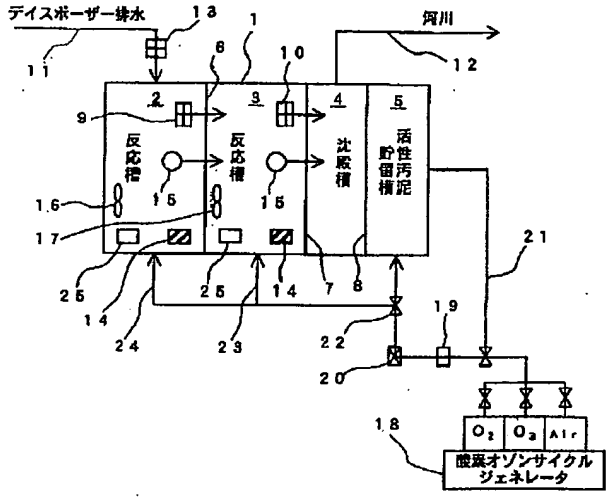
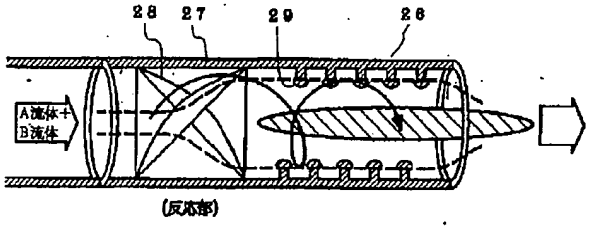
１３　スクリーン　　３２　送水管　　＊１５　酸素還元電位センサー

１４　微生物維持器　　３３　導水管　　＊

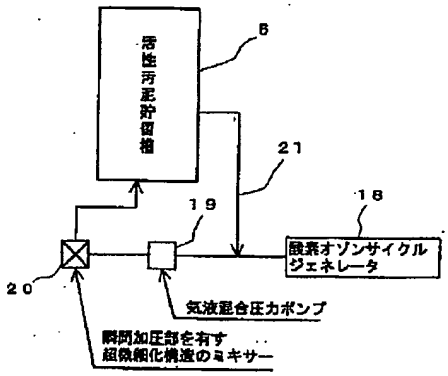
【図１】



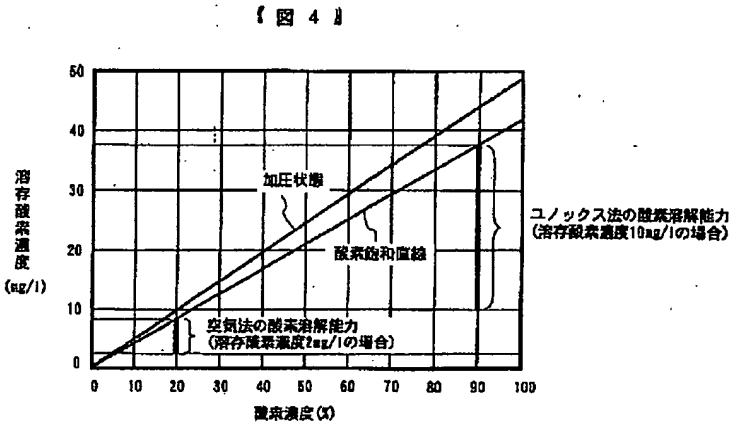
【図２】



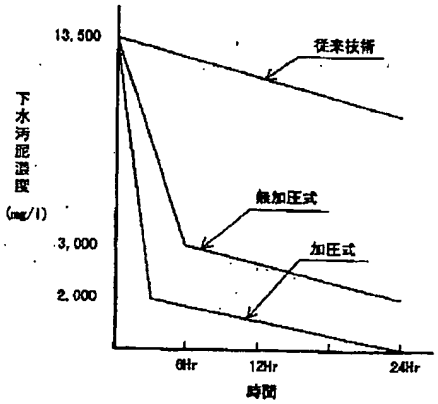
【図３】



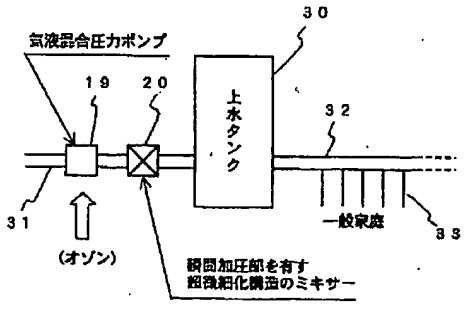
【図４】



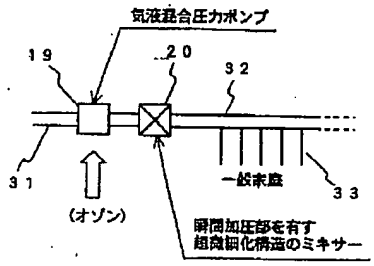
【図５】



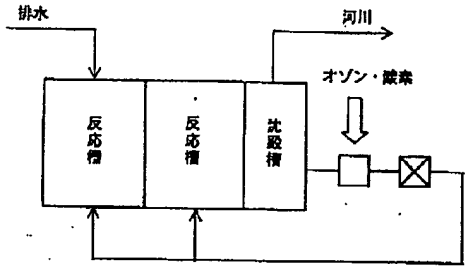
【図６】



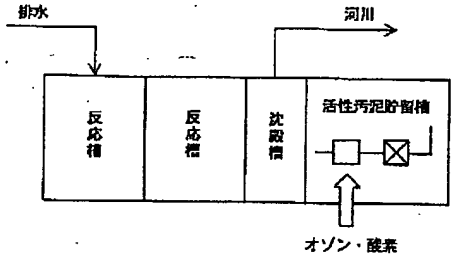
【図７】



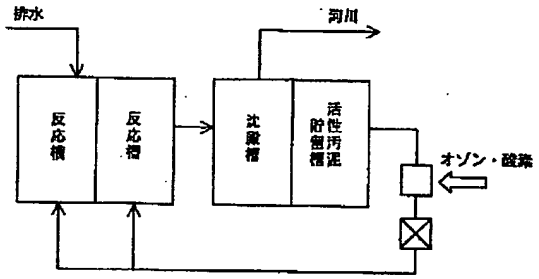
【図８】



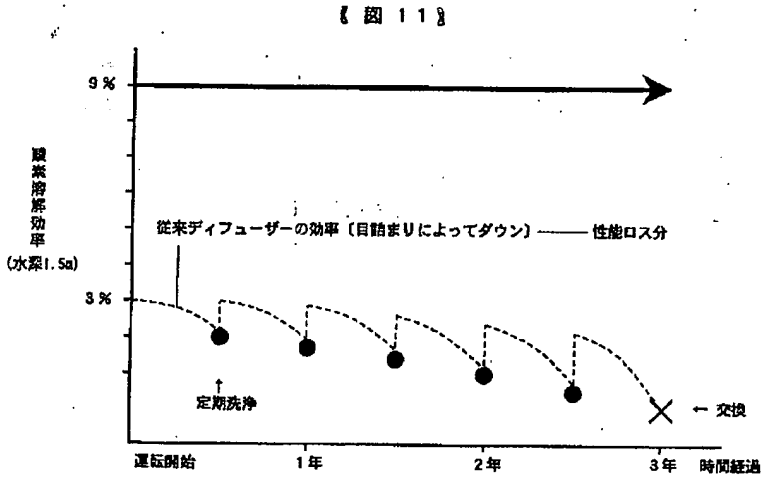
【図９】



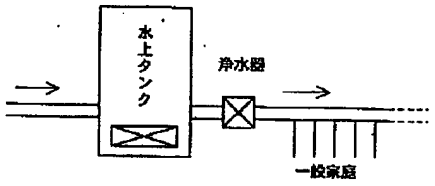
【図１０】



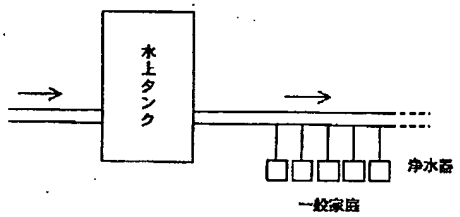
【図１１】



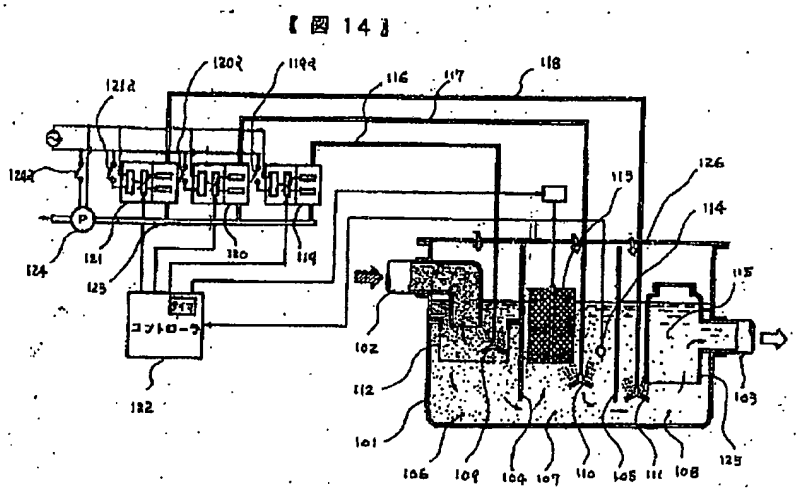
【図１２】



【図１３】



【図１４】



フロントページの続き

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